



**Resource kit for**

# **SMOG ALERT**

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**Resource kit**

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for  
Smog Alert  
A Municipal Response Guide

Ontario Ministry of the Environment  
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## INTRODUCTION

Smog is an unpleasant fact of life these days in southern Ontario — occurring most often from the end of April into mid-September. Smog is also a serious environmental problem that poses a threat to people's health and the environment.

This resource kit is designed to accompany the Ministry of the Environment (MOE) publication titled *Smog Alert — A Municipal Response Guide*. Both documents are designed to help municipal governments in Ontario play an effective role during provincial smog alerts — by taking local action to protect the health of their residents and improve air quality by reducing smog-causing emissions.

This kit describes some of the local actions that can be taken during a provincial smog alert and provides samples of communications materials that can be used as templates or adapted to suit local conditions.

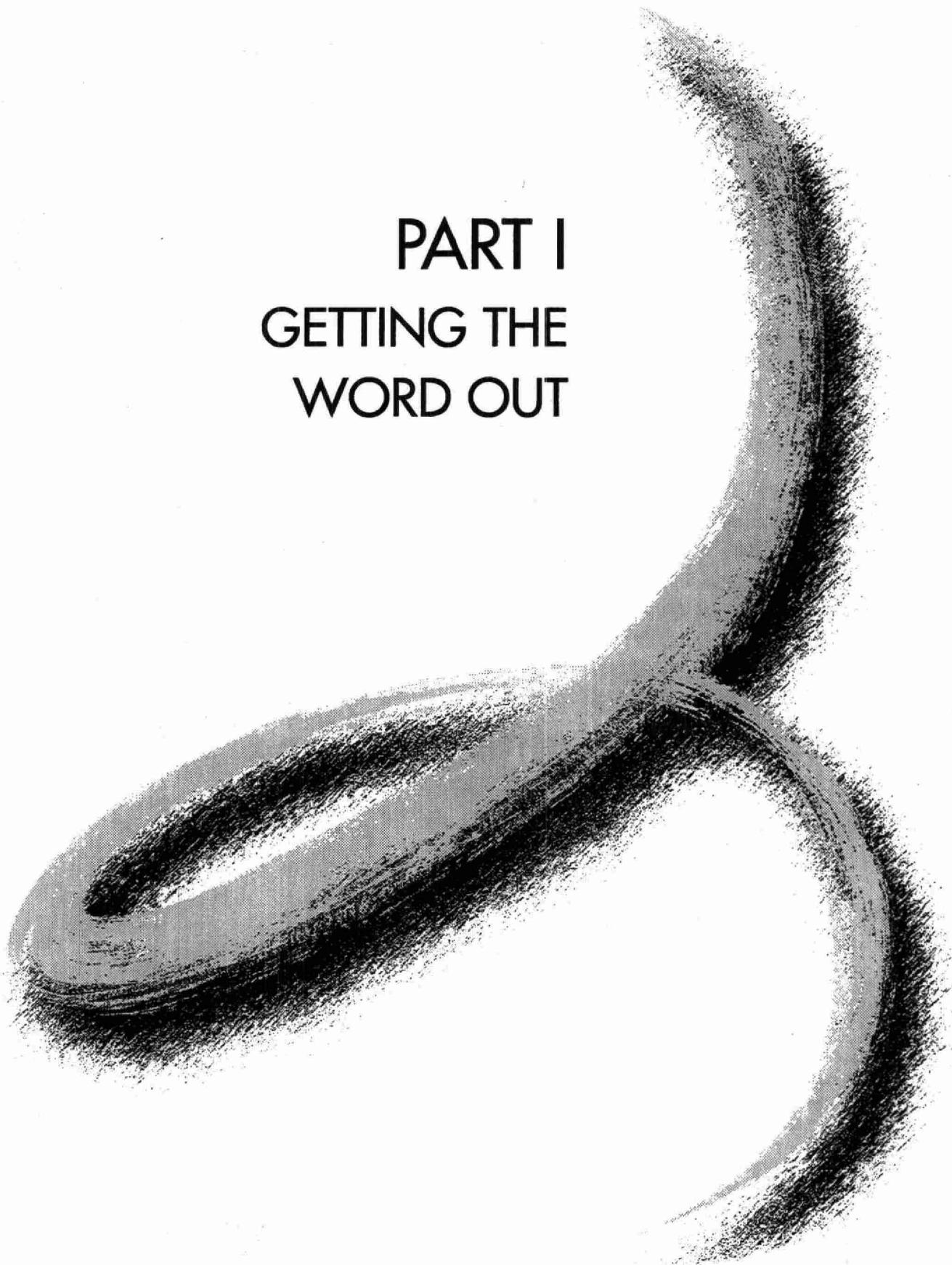
A chart that summarizes the steps involved in establishing a smog alert response is included as Appendix 1.

Like the guide, this kit is a new initiative from MOE and very much a work-in-progress. The ministry, therefore, would welcome any comments or suggestions on how the documents can be improved. Please send your suggestions to:

**Public Information Centre  
Ministry of the Environment  
135 St. Clair Avenue West  
Toronto ON M4V 1P5**

Or send us an e-mail via the MOE Web site at  
[www.ene.gov.on.ca](http://www.ene.gov.on.ca).

**PART I**  
**GETTING THE**  
**WORD OUT**





## PART I

# GETTING THE WORD OUT

### ESTABLISHING COMMUNITY CONTACTS

In *Smog Alert — A Municipal Response Guide*, the ministry provides step-by-step suggestions on how to create a municipal smog response program. Many municipalities give the job of co-ordinating such programs to the manager who is responsible for local environmental matters. Typically the co-ordinator is drawn from the departments of public health, environmental management or planning.

In creating the local smog response program, the smog response program co-ordinator will need to set up both internal and external procedures to be followed when a provincial smog alert is issued — a series of steps leading to effective actions. While the internal procedures will be different for each municipality, the external procedures will likely be similar.

The external communications process begins by establishing appropriate local contacts throughout the community.

As a first step in establishing community contacts, the co-ordinator should consider sending a letter to senior representatives of all major organizations and businesses in the municipality, including local health and educational institutions, police and other emergency services, major commercial operations and retail outlets, as well as local industries. The letter should ask each group or organization to designate a senior-level person (and at least one alternative) who can be contacted by the municipality in the event that a provincial smog alert is declared.

Ideally, the letter will help recruit a team of designated community contacts who would then be responsible for getting the word out to their organizations and clients during a provincial smog emergency. A sample community contact letter and community contact information sheet are provided in PART II of this kit.

### GETTING LOCAL MEDIA ON SIDE

The best way to inform the public about an anticipated smog alert is to contact local media outlets and obtain their co-operation in publicizing the situation.

As soon as a smog alert has been declared, the Ministry of the Environment notifies all major media, including major newspapers and radio and TV stations. The municipality's role is to alert local media and other community contacts so as to give the community as much time as possible to take appropriate health and environmental precautions.

With the media on side, the public will receive advance warning of the smog alert and have an opportunity to pass on the information to friends, family members and neighbours — in effect re-broadcasting the message again and again.

To promote media coverage of an anticipated smog alert, the smog response program co-ordinator should provide local media contacts with a concise news release or media advisory containing the following basic information:

- the date and time when the smog alert was issued (or is expected to be issued)
- the expected duration of the alert
- the geographic area affected
- how to get updated information
- the name and telephone number of the municipal smog response program co-ordinator
- the name and telephone number of the local Ministry of the Environment contact.

A sample news release is included in PART II.

## INFORMATION BACKGROUNDER

A news release is written as a short news story in a style and format that allows a local newspaper to cut and paste the item into their next edition. A good news release should contain all the basic information needed to tell a story — and nothing extra. The news release should not raise more questions or concerns than it answers.

Parents who learn about a smog alert, for example, will likely have concerns about the effects of high ozone levels on their children. Asthmatics and people who suffer from respiratory or coronary conditions may have similar concerns. Employers may also have concerns about the effect of air pollution on their staffs, or the implications of the smog alert for their companies' operations.

News releases do not respond to such concerns in much detail. But municipalities can anticipate and deal with these legitimate concerns by preparing information documents — often called backgrounders by the media — and providing them to their local media and community contacts, as well as to members of the public.

Backgrounders can provide more detailed information on subjects such as the provincial smog alert process, ozone and smog formation, the health effects of smog and its components, and actions that people can take to reduce their exposure and minimize their contribution to local emissions.

Supplementary materials should be prepared well in advance, reviewed regularly and updated as needed, to ensure that the information they contain is accurate and relevant. The best time to review the materials is in the spring, before the beginning of the smog season. Sufficient copies of all materials should be printed in advance, sorted into packages and prepared for distribution as needed.

PART II contains sample backgrounders on a range of smog-related issues. They are based on current understanding of the environmental and health

effects of ground-level ozone, and may be reprinted without changes, or revised to better reflect local conditions and concerns.

## CUSTOMIZING INFORMATION

Wherever possible, the municipal smog response program co-ordinator should tailor information packages to reflect the interests and responsibilities of those who will be receiving them — including local media outlets, hospitals and other health care facilities, the education community and local industries and businesses.

PART II offers examples of how the sample materials can be tailored for specific audiences.

## DISTRIBUTING INFORMATION

A smog alert represents a potential threat to human health and the environment. Accordingly, news releases and accompanying backgrounders should be sent out as quickly as possible — normally by fax, e-mail or courier — to primary contacts for the local smog response program.

Getting confirmation by telephone that the packages have been received by the right person is also a good idea, and gives the smog response program co-ordinator a chance to remind the program's primary contacts that additional information is available from the Ministry of the Environment and the contacts named on the news release.

## USING OTHER COMMUNICATIONS TOOLS

A number of other effective, low-cost tools can be used to supplement the information in the news release and backgrounders. Such tools ensure that awareness of the smog alert reaches as broad an audience as possible.

## *Media announcements*

Smog alerts are most effective when they are announced during weather forecasts on radio and TV, or covered in the weather sections of local newspapers, and these media can be asked to consider airing them in these spots.

## *Hotlines*

Smog alert hotlines can be set up to provide access to daily/hourly ozone levels in most areas, along with air quality predictions. Hotline access should be provided right around the clock. Most callers prefer having the option of speaking to a knowledgeable individual after listening to a recorded message.

## *Posters and displays*

Most people welcome information that's displayed on posters or stickers since it can be kept at hand for easy reference. These media can also be distributed cost-effectively to many target audiences, including members of the public, local schools, hospitals and businesses.

Posters and other display materials should contain general information on the provincial smog alert process, the causes of smog, and its effects on human health — because display materials generally have a longer shelf-life than news releases. They should include hotline numbers and Web site addresses for further information.

## *"Found" materials*

When it comes to developing information about smog, there's no need to reinvent the wheel. Many agencies, including the Ministry of the Environment, Environment Canada and Health Canada, regularly produce brochures, fact sheets, backgrounders and scientific reports that address the environmental and/or health effects of ozone and other pollutants in smog. Copies of these materials are usually available through the local offices of these agencies.

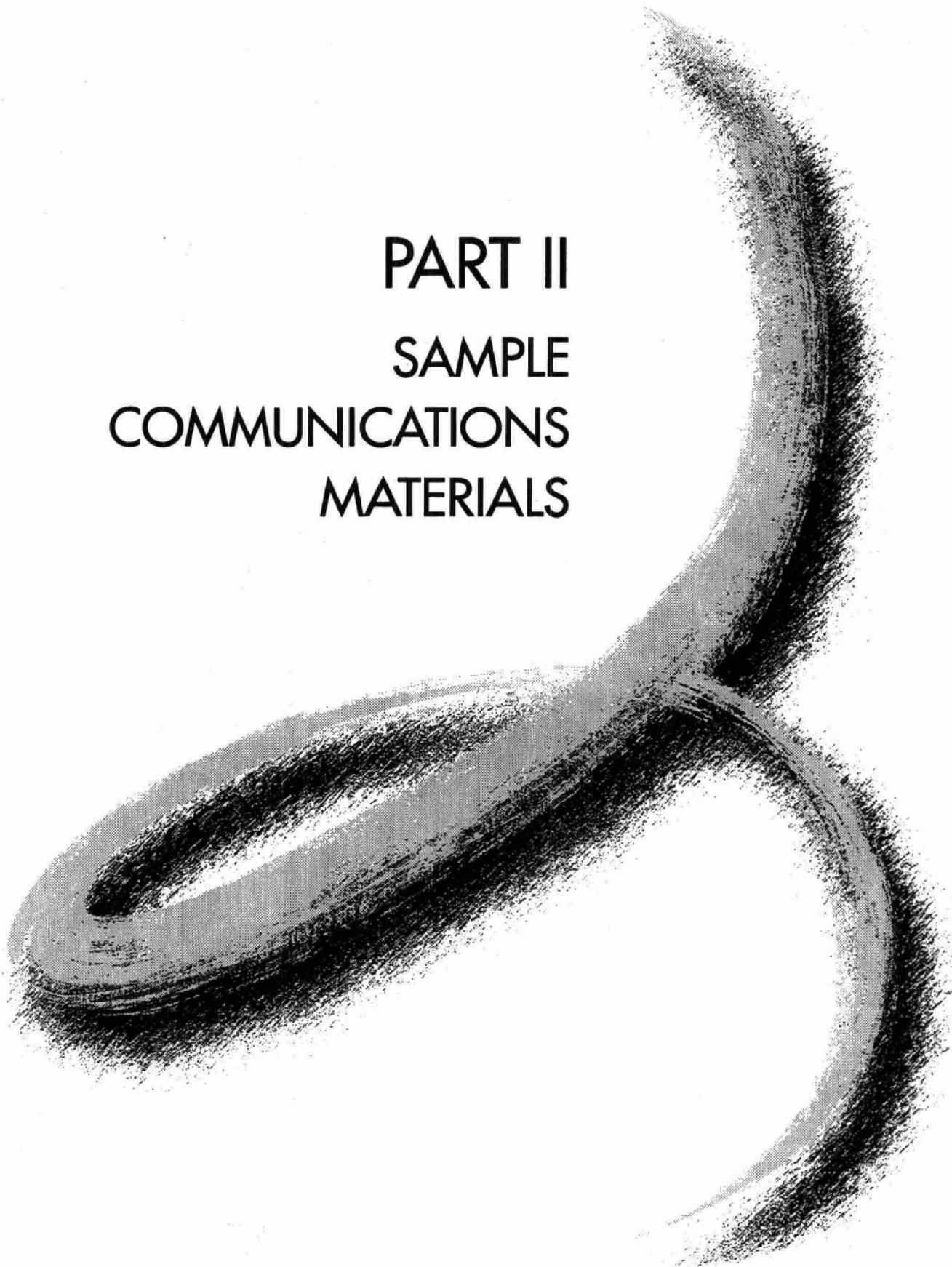
## *The Internet*

Some jurisdictions are now using the Internet to provide public access to real-time data from monitoring sites. Other electronic information often includes colour-coded illustrations of daily ozone levels, average concentrations by hour, daily peak concentrations and next-day forecasts — along with more general information on the health and environmental effects of ozone and other components of smog.

The Ministry of the Environment's Web site ([www.ene.gov.on.ca](http://www.ene.gov.on.ca)) includes the ministry's Air Quality Index (AQI), which is a rating scale for outdoor air quality in Ontario based on data from its network of monitoring stations. Air quality ratings are available at all times to Internet users ([www.ene.gov.on.ca/aqi/how.asp](http://www.ene.gov.on.ca/aqi/how.asp)), and the ministry provides the ratings to all major media outlets three times daily for 27 locations across Ontario.

## **NOTES:**

**PART II**  
**SAMPLE**  
**COMMUNICATIONS**  
**MATERIALS**





**Resource kit**

## PART II SAMPLE COMMUNICATIONS MATERIALS

Page 9 of the municipal response guide has suggestions on how to notify the community when smog alerts are forecast. The sample materials that follow — a letter to local organizations, a news release and a series of backgrounders — can be formatted on your own letterhead and used "as is", or they can be used as guides for development of your own materials.

If you would like to distribute MOE fact sheets you can find them listed in the publications section of the MOE Web site ([www.ene.gov.on.ca](http://www.ene.gov.on.ca)) or by calling the Public Information Centre at 1-800-565-4923.

In Toronto call 416-325-4000. Available titles include:

- Green Tips. Smog Alert: How to cope with bad air days
- Green Club. Kids: Ten things you can do for the air we breathe
- Driving clean cuts smog and saves you money
- Protecting Our Air
- Ontario's Drive Clean Program
- Nine Tips for Driving Clean
- Ontario's Drive Clean Fact Sheets
- Ontario's Air Quality Index

## SAMPLE CONTACT LETTER FOR LOCAL ORGANIZATIONS

Dear local resident:

The Ministry of the Environment issues official smog alerts to warn Ontario residents when unacceptably high levels of ground-level ozone are in the air.

During smog season — from around the end of April through to mid-September — the province can issue an official smog alert for a community or a larger area of the province. The alert is issued when air quality measurements, weather forecasts and related conditions in the area indicate that there will be concentrations of ground-level ozone in excess of Ontario's ambient air quality criterion, which is 80 parts per billion.

Smog alerts are usually issued the day before an ozone episode is forecast, to give local residents an opportunity to take appropriate health precautions and permit the owners or operators of local companies to plan reductions in their emissions.

Your municipal government is setting up a program to notify local organizations directly, whenever a provincial smog alert is issued for this area. When an alert is issued, we will contact you or your designated representative with information about anticipated ozone levels as well as the beginning and expected duration of the smog alert. We will also provide you with background information on the health effects of ozone and smog and actions that can minimize the emission of pollutants that can further degrade air quality.

Please take a few minutes to complete and return the accompanying form, which asks that you identify a primary contact (and at least one alternative) from your organization. When a smog alert is issued we will notify your primary contact of the situation. We will ask your contact to relay the information to the appropriate members of your organization.

Please note that completing this form and participating in this municipal program does not confer any additional legal or statutory obligations or responsibilities on either you or your organization. Our goal here is simply to protect human health and the environment.

Thank you for your co-operation. Please do not hesitate to contact me if you have any questions or would like further information.

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Municipal Smog Response Program Co-ordinator  
Name of Organization  
Address/Telephone/Fax:

## SAMPLE COMMUNITY CONTACT INFORMATION FORM

Organization: \_\_\_\_\_

Address: \_\_\_\_\_  
\_\_\_\_\_

Media outlet       Educational organization       Industry or commercial firm  
 Health care facility       Utility       Other \_\_\_\_\_

### SHORT DESCRIPTION OF PRIMARY BUSINESS:

Number of employees: \_\_\_\_\_ Number of beds (*for health care facilities*): \_\_\_\_\_

Number of students (*for educational organizations*): \_\_\_\_\_

Primary contact: (*the name of the staff person who should be notified when a smog alert is issued for your region*)

Name: \_\_\_\_\_ Title: \_\_\_\_\_

Department: \_\_\_\_\_

Address (*include floor and office number if applicable*): \_\_\_\_\_  
\_\_\_\_\_

Phone number: (      ) \_\_\_\_\_ Extension: \_\_\_\_\_ Fax: \_\_\_\_\_

E-mail: \_\_\_\_\_

Alternative contact: (*the name of the staff person who should be notified of a smog alert if the primary contact is unavailable*)

Name: \_\_\_\_\_ Title: \_\_\_\_\_

Phone number: (      ) \_\_\_\_\_ Extension: \_\_\_\_\_ Fax: \_\_\_\_\_

E-mail: \_\_\_\_\_

Date information last updated: \_\_\_\_\_

## SAMPLE NEWS RELEASE

For immediate release

Date: \_\_\_\_\_

# SMOG ALERT ISSUED FOR TOMORROW IN THE WINDSOR-SARNIA AREA

**WINDSOR** — With hot, humid weather in the area predicted to continue for the next few days, the Ministry of the Environment (MOE) is warning that an air mass with high concentrations of ground-level ozone will move into the Windsor-Sarnia area by early tomorrow afternoon. The ministry is predicting the unhealthy air quality conditions will persist through to Friday.

Exposure to ground level ozone can cause coughing, headaches, nausea, and irritation of mucous membranes, and may also cause premature aging of the lungs. Those at special risk include young children, the elderly, asthmatics, and anyone with existing respiratory or coronary conditions.

Local health officials are recommending that these vulnerable people remain indoors tomorrow if possible. They also point out that even healthy adults should avoid strenuous outdoor exercise until local ozone levels drop.

The municipality is also asking residents, individuals as well as organizations, to reduce activities that contribute to smog.

"We are urging all residents to avoid unnecessary car travel, and asking local companies to take action to reduce their emissions," said \_\_\_\_\_, smog response program co-ordinator for \_\_\_\_\_ (name of municipality).

Under Ontario's ambient air quality criterion for ozone, air quality is considered unhealthy when concentrations of ozone exceed 80 parts per billion, averaged over one hour.

Although much of the region's smog is blown in from sources in the U.S. Midwest, local sources also contribute to the problem.

In southwestern Ontario, ozone levels are generally highest from 2 in the afternoon to 8 at night, and lowest in the morning. The province has already issued three smog alerts for Windsor-Sarnia this year.

Regular updates on outdoor ozone levels will be distributed to television and radio stations and other media outlets. Additional information on the health effects of ozone and smog, as well as the steps individuals and companies can take to reduce emissions, is available from \_\_\_\_\_ (name of municipality) or the local MOE office.

For more information, contact:

---

(municipal contact name and telephone number)

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(MOE contact name and telephone number)

Regular air quality updates can be found on the MOE air quality index Web page:  
[www.ene.gov.on.ca/aqi/how.asp](http://www.ene.gov.on.ca/aqi/how.asp)

## SAMPLE BACKGROUNDER

### BACKGROUNDER 1 — SMOG ALERTS AND GROUND-LEVEL OZONE

#### *What is a smog alert?*

The Ministry of the Environment has a special program to warn Ontario residents when unacceptably high levels of ground-level ozone are predicted in a given region for the next day.

A provincial smog alert may be issued any time from the end of April through to mid-September. An alert is issued whenever, based on current measurements and forecasts, concentrations of ground-level ozone over a wide geographical area are expected to exceed the province's ambient air quality criterion of 80 parts per billion averaged over one hour.

Smog alerts are announced with the help of the media — usually on the day before a high ozone episode is expected. The advance warning gives local residents an opportunity to take appropriate health precautions and reduce their contribution to air pollution.

#### *What is ozone?*

Ozone is a colourless gas with a distinctive odour, formed by the interaction and recombination of other air pollutants. Ground-level ozone — which occurs in the troposphere, between the earth's surface and 15 kilometres above the earth — is the main ingredient in smog, which is one of Ontario's most persistent air quality problems.

Ground-level ozone is formed when nitrogen oxides ( $\text{NO}_x$ ) and volatile organic compounds (VOCs) react in the presence of sunlight.  $\text{NO}_x$  are emitted from many sources, including automobiles, electricity generating stations, incinerators and many industries. VOCs are released by the evaporation of solvents, paints and other chemical products, and are also emitted by motor vehicles and burning wood.

Smog also contains many fine particles — mainly byproducts of fuel combustion and industrial processes. Fine dust and ash are also blown up from roads, construction sites and agricultural areas and are released by forest fires.

#### *Where does ozone come from?*

Much of Ontario's air pollution is released by burning oil, gas, gasoline, coal and other fossil fuels in vehicles, homes and businesses, industrial and commercial boilers and electricity generating plants. Several natural sources also contribute to smog levels, but human activities are largely responsible for the increases in ground-level ozone documented across Canada in recent years.

Ozone can be formed from both local and distant pollution sources. On hot summer days, more than 50 per cent of the ozone affecting Ontario is generated by pollutants that are carried in the air mass coming from the United States.

#### *Where are ozone levels highest?*

The highest ozone and smog levels are seen in southwestern and southern Ontario. High ozone levels have been measured most often at Long Point, on the north shore of Lake Erie. Among Ontario's urban areas, Windsor experiences high ozone levels most often, while Windsor and Hamilton share the highest percentage of days when fine particulate exceeds the province's ambient air quality criterion.

### ► *Is smog related to weather?*

Air pollution levels are strongly influenced by the weather. The prime conditions for creating ground-level ozone (and therefore smog) are when temperatures are near or above 30°C (86°F), when there are few clouds, and there is little or no wind.

Ozone levels are often at their highest in the summer, when it is sunny and hot. During the daytime, ozone levels tend to peak in the mid-afternoon, after the intense sunlight has had a chance to "cook" the exhaust and emissions from vehicles and industries. Ozone levels generally drop rapidly in the evening, after the sun has set.

Levels of particles tend to rise during the week, when traffic and industrial activity are at their height, and recede over the weekend.

Temperature inversions and other climatic conditions can also trap stagnant, smoggy air over a region for several days at a time. Ontario's smog season usually lasts from May to September.

During the winter, inhalable particles, rather than ozone, constitute the main ingredients of smog.

## BACKGROUNDER 2 — PROTECTING YOURSELF ON SMOG ALERT DAYS

Ground-level ozone — one of the key ingredients in smog — acts as an irritant in the lungs and respiratory system. Inflammation of the air passages can persist for up to 18 hours after exposure and can cause coughing, wheezing and tightness in the chest. Some people may also experience watery eyes, headaches, impaired vision, fatigue and difficulty concentrating.

While there is a significant variation in individual sensitivities, people who are most susceptible may suffer symptoms after only one or two hours outdoors.

### ► *What to do when you hear an alert*

The following are some simple precautions you can take to reduce your exposure to smog and its potential health effects:

- **Share the news.** Not everybody listens to the news or tunes in to the local weather forecasts. Tell your neighbours, colleagues and family about a smog alert. Discuss your concerns about smog with other people, including your children, and pass along these common-sense safety tips.

- **Watch your children carefully.** Youngsters tend to be more sensitive than adults, because their developing lungs work harder and because, in summer, children spend more time outdoors being physically active. Reduce your children's exposure by encouraging outdoor activities early in the day when pollutant levels are lower. When smog levels are high, have them play indoors.

- **Stay inside as much as possible,** especially in late afternoon and early evening. Those at greatest risk — asthmatics, the elderly, people suffering from respiratory or cardiac conditions and people who are more sensitive to ozone or other chemical pollutants — should try to limit their time outdoors in order to reduce their risk of exposure to ozone. Try to stay in a place that is cool and moist.

- **Try not to overexert yourself.** Even healthy people should avoid strenuous outdoor exercise or work, especially during the afternoon and early evening when ground-level ozone levels are at their highest.

- **Avoid jogging and other exercise** near heavy traffic areas, especially during rush hour, to minimize your exposure to pollution from motor vehicles.

- **Contact your doctor or local clinic** if at any time you experience characteristic symptoms of pollutant exposure — such as tightness in the chest, coughing, wheezing and shortness of breath.

## BACKGROUNDER 3 — WHAT YOU CAN DO TO REDUCE SMOG

We all have a role to play in reducing ground-level ozone and smog.

Whether we are drafting a corporate policy or making routine lifestyle choices, our daily decisions have a direct effect on the amount of pollution that goes into the air. During a smog alert especially, people should limit activities that contribute to air pollution, such as taking unnecessary trips in the car, using gas-powered machinery and using solvent-based paints.

### *Transportation*

Although today's vehicles run cleaner than ever, motor vehicles are still the leading source of air pollution. Transportation vehicles are responsible for about half of the nitrogen oxides and a significant share of the VOCs that react to form ozone and smog. Following these simple guidelines will make a difference:

- Choose the cleanest possible commute by walking or biking, sharing a ride to work or using public transportation instead of your car: one busload of passengers saves nine tonnes of air pollution each year.
- Set up a ride share program in your office or your neighbourhood to encourage car-pooling and reduce the number of cars on the road. If you own or manage a business, consider offering incentives, such as free bus tickets or more flexible working hours, to help employees make the switch to public transportation.
- If you absolutely have to drive, be sure to combine errands and cut down on the number of trips you make. Driving fewer miles will help reduce air pollution. Avoid driving during peak traffic periods when stop-and-go traffic is at its worst, and listen to traffic reports to avoid congestion.

- Never idle your engine. Idling for just 30 seconds uses more fuel than turning off the engine and restarting it. Most cars and trucks require only 15 to 30 seconds of idling before being driven, even in winter.
- Always drive at a steady, moderate pace. Continual speeding up and braking, whether in heavy traffic or on the open road, is hard on your vehicle and wastes fuel. Transport Canada estimates that speeding and jack-rabbit starts can increase fuel consumption by up to 20 per cent.
- Travel light. The more weight your car carries, the less fuel-efficient it becomes. Take unnecessary items out of the trunk.
- Turn off the car's air conditioner — it's a drag on your car's engine and reduces gas mileage by as much as 20 per cent.
- Refuel cars and trucks after dusk when the sun is no longer transforming the air pollutants from car exhaust and spilled fuel into smog.
- Follow gasoline refueling instructions for efficient vapour recovery, and be careful not to spill fuel. Don't overfill the tank, since this allows fumes to escape. When you are finished refueling, make sure to tighten the gas cap securely.

### *Other ways to cut smog*

- Conserve electricity by setting air conditioners no lower than 25°C (77°F). Fans use much less energy than air conditioners. Learn more about alternative energy sources and energy efficient lighting, appliances and office equipment. Turn off the lights when you don't need them.

- Avoid using oil- and solvent-based paints, aerosol sprays and cleaners, mineral spirits, de-greasers, or lighter fluid — all of which are major sources of smog-causing volatile organic compounds (VOCs). Use alternative products wherever possible.
- If you need to dispose of solvent-based products, gasoline or other fuels, do so with care. Never put these chemicals down the drain, in the ground or in the garbage. Call your local Ministry of the Environment office or municipality for information on proper disposal of these products.
- Make sure that containers of household cleaners, workshop chemicals and solvents and garden chemicals are tightly sealed to prevent volatile chemicals from evaporating into the air. Never leave containers standing open when not in use.
- During a smog alert use alternatives to gasoline-powered vehicles and machines such as motorbikes, motorboats and lawnmowers. Put away your gasoline-powered lawn and garden equipment until after the alert. Over the longer term, move to electric-powered or, even better, manual tools, which don't produce any pollution.
- Use wood stoves and fireplaces wisely and sparingly. Burn only dry, well-seasoned wood and build efficient fires that burn hot and clean. A well maintained, well operated stove produces less pollution, so be sure to check your stack, clean your chimney and inspect your catalyst every year.
- On smog alert days don't light up — whether it's your gas barbecue or a cigarette. The smoke will add more pollutants and further deteriorate air quality in and around your home. Take a break — don't smoke, and enjoy light meals that need little or no cooking.

## BACKGROUNDER 4 — SMOG AND YOUR HEALTH

The word smog was coined more than 40 years ago to describe the simultaneous presence of smoke and fog in the environment. In recent years, it has come to mean the brownish yellow haze that settles over urban areas on hot, sunny days, although suburban and rural communities are not immune to smog's effects.

Formed mainly from motor vehicle exhaust and industrial pollution in the presence of sunlight, smog can be transported by prevailing winds and weather systems. And whatever its location, smog represents a serious health hazard.

The main health concern related to smog is its potential to affect the respiratory system. Because smog is a complex mixture of pollutants, its possible health effects vary. In some cases, the health effects of one pollutant may be intensified when combined with another.

For example, ozone may provoke a stronger reaction when coupled with acidic air pollutants and nitrogen dioxide. Much research remains to be done to determine the health effects of various chemical combinations and of long-term exposure to low levels of smog.

### *Ground level ozone*

Ground level ozone is formed when nitrogen oxides ( $\text{NO}_x$ ) and volatile organic compounds (VOCs) combine in the presence of sunlight — and it's the main component of smog.  $\text{NO}_x$  compounds are produced mainly by the high temperature burning of fuels and by motor vehicles, certain manufacturing industries and fossil-fueled power plants and factories. Human-made sources of VOCs include the evaporation of gasoline from gas pumps, surface coatings such as oil-based paints, barbecue starter fluid and other solvents, as well as fuel combustion.

Because sunlight is a key factor in the formation of ground-level ozone, ozone levels are most often highest on hot summer days. Stagnant air masses can trap pollutants over a region for several days so that ground-level ozone accumulates.

Ozone is a powerful and irritating pollutant. Short-term exposure can irritate the nose and throat and cause coughing and difficult or painful breathing. A reduction in lung function, resulting from an inflammatory response in the lung, has been seen in clinical short-term exposure studies even at prevailing ambient ozone levels.

The effects of ground-level ozone can be made worse by outdoor exercise, since people inhale more air when they exercise. The more activity we undertake when ozone levels are high, the more ozone we breathe in — and the greater the chance that it will affect our health.

Scientific studies indicate that respiratory symptoms subside after a few days of repetitive exposure and the discomfort disappears. However, while the outward symptoms may disappear, damage may continue to occur deep in the lungs.

Recent research indicates that ground-level ozone increases the susceptibility of asthmatics to common allergens. As well, people with respiratory problems may suffer more symptoms during periods of high ozone levels. Higher than usual numbers of respiratory admissions to hospital have been observed in Ontario when levels of ozone and/or sulfates (another air pollutant) are elevated.

Children are more at risk because they tend to spend more time outdoors being physically active. Elderly people are also more susceptible to ozone because it can aggravate existing conditions, such as cardiovascular disease. Current research indicates a small part of the general population (between five and 20 per cent) may be significantly more sensitive to ozone than others, although the precise scientific reasons for this are not yet known.

Scientific investigation of the effects of low-level, long-term exposure to ground-level ozone is underway. Animal studies undertaken to date indicate that long-term inflammation and biochemical changes result in a decreased ability of the lung to resist disease. As well, a small percentage of the ozone inhaled has been shown to penetrate deep into the lung, damaging some of the alveoli — the individual air sacs in the lung where oxygen and carbon dioxide are exchanged.

Animal studies, together with human population studies, suggest that ozone exposure may accelerate the rate at which lung tissue ages. As a result of these observations, scientists are continuing to investigate cell and tissue changes that result from long-term low-level exposure to ozone.

### *Acid gases*

In addition to ground-level ozone, acid gases represent an important component of smog. Acid gases present in air pollution include sulphur dioxide and oxides of nitrogen, which are produced mainly by burning fossil fuels and smelting ores. This mix of pollutants, which can be carried hundreds of kilometres by air currents, combines with water vapour to form acidic chemical compounds such as sulphuric and nitric acid. Some of this pollution falls to earth as acid rain, while the rest remains suspended in the air in the form of acid dust or droplets. As a result, people who live far away from the original source of the pollutants often end up breathing the polluted air.

Because airborne acidic particles are small enough to penetrate deeply into the lungs, they can cause a range of respiratory problems. In the laboratory, exposure to acidic air pollutants has produced effects such as coughing, congestion and constriction of the airways, making it more difficult to move air in and out of the lungs. Other effects include increased mucus production in the respiratory system and reduced ability to clear foreign matter from the lungs.

People considered to be most at risk of adverse health effects from acidic air pollution are children, people with asthma, elderly people and those who work or exercise outdoors. Research is ongoing to further evaluate the direct health effects in these populations.

### *Other smog components*

Although the other components of smog occur in smaller quantities than ozone, they too can affect our health. They include nitrogen oxides, sulphur oxides and sulfates, and volatile organic compounds (VOCs), peroxyacetyl nitrate (PAN), particulates and carbon monoxide.

While most emissions of  $\text{NO}_x$  are transformed into ozone, some remain as  $\text{NO}_x$  in their own right. The effects of inhaling  $\text{NO}_x$  are similar to the health effects of acidic gases described earlier.  $\text{NO}_x$  are emitted mainly from fossil fuel combustion.

The eye irritation commonly associated with smog is the result of two pollutants: PAN, which is derived from motor vehicle exhaust, and aldehydes such as formaldehyde, a class of VOC that is released by various combustion processes.

Fine particulates originate from several sources, including diesel exhaust and industrial activities, and are of concern to human health for two reasons. First, they are small enough to be inhaled and may be deposited deep in the lungs. Second, and even more important, they act as a transport medium for compounds such as acids or metals that adhere to them. Particulates — and whatever attaches to them — are known to cause short-term respiratory irritation and are the subject of continuing research. Carbon monoxide, which is emitted from all motor vehicle exhaust, may decrease the performance of people who are exercising in a smoggy environment. Carbon monoxide binds with red blood cells much more readily than does oxygen and therefore competes with oxygen by being transported to the muscles and organs. If some red blood cells bind with carbon monoxide instead of oxygen, there may be less oxygen available to the body.

People with chronic angina (heart pain) are particularly susceptible to the effects of carbon monoxide. Other possible risk groups include pregnant women, infants, people with cardiovascular or respiratory disease, elderly people and young children. Smokers may be a special risk group, because they already have higher levels of carbon monoxide from smoking.

## **BACKGROUNDER 5 — INDUSTRY AND COMMERCE: WHAT YOU CAN DO TO REDUCE EMISSIONS DURING A SMOG ALERT**

### *General actions*

- Avoid unnecessary open burning, except as required for the disposal of inflammable or otherwise hazardous gases or liquids.
- Limit the use of waste incinerators to between 12 noon and 4 p.m., to make maximum use of atmospheric turbulence.
- Limit boiler-lancing, and the soot-blowing of fuel-burning equipment that requires this operation, to between 12 noon and 4 p.m., to make maximum use of atmospheric turbulence.
- Limit the use of private and commercial motor vehicles by postponing unnecessary travel and using car pools or public transportation facilities where possible.

### *Coal or oil-fired electric power generating facilities*

- Operate natural gas units whenever possible, since these burn the cleanest fuel. Use other units sparingly, and preferably those which use fuels that produce the lowest amounts of sulphur and ash.
- Undertake boiler-lancing or soot-blowing, where required, between 12 noon and 4 p.m.

to make maximum use of atmospheric turbulence.

- Where possible, use power that is generated outside the alert area.

#### *Other coal and oil-fired process steam generating facilities*

- Operate natural gas units whenever possible, since these burn the cleanest fuel. Use other units sparingly and preferably those which use fuels that produce the lowest amounts of sulphur and ash.
- Undertake boiler-lancing or soot-blowing, where required, in the afternoon between 12 noon and 4 p.m., to make maximum use of atmospheric turbulence.
- Reduce steam loads to the greatest extent possible, consistent with continuing plant operations.
- Be prepared to implement your action plan in the event of a smog alert.

- Undertake boiler-lancing or soot-blowing, where required, between 12 noon and 4 p.m. to make maximum use of atmospheric turbulence.

#### *Manufacturing industries requiring relatively short lead times for shutdown*

- Eliminate air contaminant emissions from processing operations by ceasing, curtailing, postponing or deferring production and allied operations to the extent possible without causing personal injury or equipment damage.
- Cancel waste disposal operations that emit solid particles, gases, vapours or malodorous substances.
- Minimize the heat load demand for processing to the greatest extent possible.
- Undertake boiler-lancing or soot-blowing, where required, between 12 noon and 4 p.m. to make maximum use of atmospheric turbulence.

#### *Manufacturing industries which require a long lead time for shutdown*

(Including petroleum refining, chemical industries, primary metals industries, glass industries and the paper and allied products sector)

- Air contaminant emissions from processing operations should be substantially reduced by curtailing or postponing production and allied operations to the extent possible without causing economic hardships.
- Defer waste disposal operations that emit solid particles, gases, vapours or malodorous substances.
- Minimize the heat load demand for processing to the greatest extent possible.

## EXAMPLES OF CUSTOMIZED INFORMATION PACKAGES

### *Sample media information package*

A typical media package should contain the following:

- News release
- Backgrounder 1 *Smog alerts and ground-level ozone*
- Backgrounder 2 *Protecting yourself on smog alert days*
- Backgrounder 3 *What you can do to reduce smog*

### *Sample health community information package*

A typical information package for hospitals and other health care facilities should contain the following:

- News release
- Backgrounder 1 *Smog alerts and ground-level ozone*
- Backgrounder 2 *Protecting yourself on smog alert days*
- Backgrounder 3 *What you can do to cut smog*
- Backgrounder 4 *Smog and your health*

### *Sample educational community information package*

A typical information package for distribution to schools and school boards, and other educational facilities, should contain the following:

- News release
- Backgrounder 1 *Smog alerts and ground-level ozone*
- Backgrounder 2 *Protecting yourself on smog alert days*
- Backgrounder 3 *What you can do to cut smog*

### *Sample industrial and commercial information package*

A typical information package to be distributed to area businesses, industrial facilities and commercial operations should include the following:

- News release
- Backgrounder 1 *Smog alerts and ground-level ozone*
- Backgrounder 2 *Protecting yourself on smog alert days*
- Backgrounder 3 *What you can do to cut smog*
- Backgrounder 5 *Industry and commerce: What you can do to reduce emissions during a smog alert*

## APPENDIX I

### ESTABLISHING A SMOG ALERT RESPONSE

#### 1. Establish a smog alert response policy

- designate municipal staff to evaluate options for a smog alert response and develop preferred strategy and policy, which:
  - \* sets out actions to be taken by municipal departments to reduce smog-producing emissions
  - \* sets out process for communications with municipal stakeholders
  - \* sets out municipal role for encouraging smog-reducing actions on the part of all members of the municipality



#### 2. Establish a smog alert response committee

- membership drawn from all key departments, including representation from senior management
- responsible for developing a smog alert response process and supporting smog alert response co-ordinator



#### 3. Appoint a smog alert response co-ordinator

- a senior staff person (usually from within middle management and from health dept., environmental division or planning) with authority to make management decisions
- responsible for establishing the program and co-ordinating related activities
- responsible for co-ordinating internal and external notification and communications



#### 4. Develop a smog alert response action plan

- clearly define and delineate roles and responsibilities
- develop training program for municipal staff and develop support materials
- establish external contact list
- develop internal and external communications strategy
- define process for notifying municipal staff (internal)
- define process for communications with members of municipality (external), including development of a media relations plan
- give Ministry of the Environment contact name for smog alert advisories

### 5. Training of municipal staff

- provide rationale for establishing municipal smog alert response
- define roles and responsibilities within workplace
- clearly define municipality's and employees' goals and objectives as they relate to response program
- secure employee input and encourage involvement

### 6a. Smog alert response - internal



#### Implement internal notification system

- review roles and responsibilities with departmental contact
- review roles and responsibilities with backup contact
- ensure call back verification process in place
- implement dry-run testing program to verify process works properly and to identify potential problems and their solutions



#### Implement employee awareness and participation program

- keep employees informed and provide regular updates
- ensure ongoing communications and education
- host special events, competitions and smog reduction campaigns
- display list of response actions/posters to encourage continued staff awareness and participation

### 6b. Smog alert response - external



#### Initial contact with municipal stakeholders

- meet with local groups, facilities and organizations to request their cooperation and participation in the smog alert program
- explain role of municipality and the purpose and function of the smog alert program
- distribute information kit to local media and identify and meet with media contacts to discuss smog alert program
- complete contact record sheet for each point of contact



#### Assemble smog alert contact information/materials

- develop contact list, including primary and secondary contacts, phone and fax numbers and courier, e-mail, and mailing addresses.
- construct contact list based on order of priority:
  1. local media, health facilities (hospitals, nursing homes, etc.), educational community (schools, day care facilities, board of education, etc.), recreational facilities
  2. other institutions and industrial, commercial and transportation-related facilities (priority should be given to those facilities that have greatest effect on smog production)
- assemble stakeholder information kits for future distributions
- test-run communications process and make necessary corrections
- regularly update contact list

## APPENDIX II

### ONTARIO AIR QUALITY REGULATIONS

The following provincial regulations are designed to protect air quality in Ontario:

- O.Reg. 271/91, *Gasoline Volatility*, requires reduced vapour emissions by lowering the volatility limit for gasoline during the summer.
- O.Reg. 336/90, *Air Contaminants from Ferrous Foundries*, sets industry-specific particulate emissions rates and collection efficiencies and prohibits water fallout beyond the property line.
- O.Reg. 337/90, *Ambient Air Quality Criteria*, sets desirable ambient air quality criteria (averaged over a prescribed time period) for specified air pollutants.
- O.Reg. 338/90, *Boilers*, sets the sulphur content of fuel oil and coal at less than one per cent except for boilers at Ontario Hydro and in homes. Grey and Bruce counties and areas where certificates of approval apply are excluded.
- O.Reg. 346/90, *General — Air Pollution*, sets forth a number of mechanisms and requirements which the ministry uses to protect air quality and prevent adverse environmental effects, including the Air Pollution Index, opacity requirements, fuel burning requirements, a ban on apartment incinerators and maximum half-hour point of impingement concentrations for specified pollutants.
- O.Reg. 349/90, *Hot Mix Asphalt Facilities*, prohibits visible emissions and materials, including water plumes, from impinging outside a property line.
- O.Reg. 350/90, *Lambton Industrial Meteorology Alert*, defines the conditions that would give rise to, and terminate, an air pollution alert in Lambton County, as well as the actions to be taken during such an alert.
- O.Reg. 355/90, *Ontario Hydro (Countdown Acid Rain)*, limits sulphur dioxide and acid gas emissions from listed facilities.
- O.Reg. 356/90, *Ozone Depleting Substances— General*, bans chlorofluorocarbons (CFCs) in aerosols and phases out CFC-blown foam.
- O.Reg. 361/90, *Sulphur Content of Fuels*, applies to the Municipality of Metropolitan Toronto and prohibits the use or sale of any fuel with a sulphur content greater than what is specified in the regulatory schedule without a certificate of approval.
- O.Reg. 413/94, *Halon Fire Extinguishing Equipment*, covers the filling, servicing, labeling and disposal of equipment containing halons.
- O.Reg. 455/94, *Recovery of Gasoline Vapour in Bulk Transfers*, controls vapour emissions during the transfer of gasoline at terminals, bulk plants and service stations.
- O.Reg. 660/85, *Inco (Countdown Acid Rain)*, limits sulphur dioxide emissions from listed facilities.

- O.Reg. 661/85, *Falconbridge (Countdown Acid Rain)*, limits sulphur dioxide emissions from listed facilities.
- O.Reg. 663/85, *Algoma (Countdown Acid Rain)*, limits sulphur dioxide emissions from listed facilities.
- O.Reg. 189/94, *Refrigerants*, prevents potential release of ozone-depleting fluorocarbons from refrigerators and air conditioning equipment.
- O.Reg. 323/94, *Dry Cleaners*, requires dry cleaners to be trained in the safe handling of dry-cleaning chemicals as certified professionals.
- O.Reg. 717/94, *Solvents, CFCs used as Solvents*, limits the use, storage, discharge and disposal of solvents containing various classes of ozone-depleting substances.
- O.Reg. 718/94, *Sterilants, CFCs used as Sterilants*, limits the use, storage, discharge and disposal of sterilants containing various classes of ozone-depleting substances.
- O.Reg. 361/98, *Drive Clean*, requires mandatory emissions testing for cars, trucks and buses.

## APPENDIX III

### FEDERAL SMOG CONTROL INITIATIVES

#### FEDERAL RESPONSIBILITY FOR TRANS-BOUNDARY POLLUTION

Because air pollutants can travel thousands of kilometres and can persist in the atmosphere for many years, the federal government is responsible for negotiating international control programs for pollutants that cross provincial and national boundaries.

Environment Canada works closely with other governments — both at home and abroad — to implement agreements aimed at addressing trans-boundary issues such as acid rain. A number of agreements have an effect on smog levels:

- ***Canada-U.S. Air Quality Accord*** — In 1991, Canada and the United States signed an Air Quality Accord providing for the study and control of air pollutants that cross the international boundary. The major goal of this agreement was to reduce acid rain by cutting emissions of sulphur dioxide by 40 per cent and nitrogen oxides by 10 per cent. As both these pollutants are also major contributors to the smog problem, urban air quality should also benefit.
- ***International VOCs Protocol*** — In 1991, Canada, the United States and 19 European countries signed an agreement to reduce VOC emissions and their transport across international boundaries. The protocol commits Canada to reducing annual VOC emissions in the Lower Fraser Valley and Windsor-Quebec corridor by 30 per cent by the year 1999 (based on 1988 levels) and a national freeze on VOC emissions at 1988 levels by 1999. Canada has not yet ratified the agreement.

- ***International NO<sub>x</sub> Protocol*** — In 1988, Canada, the United States and a number of European nations signed an international agreement to freeze NO<sub>x</sub> emissions at 1987 levels by the year 1994. This goal has now been met, and a second agreement is being negotiated to further reduce NO<sub>x</sub> emissions.

#### OTHER TRANS-BOUNDARY SMOG REDUCTION INITIATIVES

The federal government encourages industries on both sides of the Canada/U.S. border to take part in voluntary efforts to reduce smog. The federal government also develops regulations to control the release of air pollutants into the atmosphere.

In 1993, the Canadian Council of Ministers of the Environment (CCME), the Council of Energy Ministers, and the Canadian Environmental Protection Act Federal Provincial Alert Committee (CEPA/FPAC) jointly signed a Comprehensive Air Quality Management Framework for Canada. The framework established a mechanism for co-ordinating actions on regional, national and international issues, especially those with trans-boundary or global effects.

#### THE FEDERAL SMOG MANAGEMENT PLAN

Canada's first comprehensive plan to address the problem of ground-level ozone was developed in 1990 by the federal and provincial governments in consultation with industry and with public interest and environmental groups. Initiatives are planned to reduce smog, advance research, collect information and set Canada-wide pollution standards.

Phase 1 of the plan, which has been largely completed, involved the introduction of new emission controls for cars and light-duty trucks. In addition, national codes, guidelines and standards of performance were developed for power plants, industrial furnaces, industrial processes, solvents, paints and cleaners, fuel storage and handling and commercial activities such as dry cleaning.

Phase 2, announced in November 1997, builds on these initiatives while taking into account related measures on acid rain, climate change, energy efficiency and transportation. The federal government is currently developing more stringent air quality objectives and working to meet Canada's international air quality commitments.

### THE NO<sub>X</sub>/VOCs MANAGEMENT PLAN

The 1990 plan contains dozens of initiatives to reduce NO<sub>X</sub> and VOC emissions and reverse the increase of pollution that could accompany any growth in Canada's population and economy. Under the plan, modest reductions in NO<sub>X</sub>, VOCs and ozone levels in Canada's smog hot spots are expected up to the year 2010. Action under the plan includes energy conservation measures, industrial source controls and product modifications. These efforts are being matched by provincial and regional governments to specifically target the areas hardest hit by smog.

### CLEANER VEHICLES AND FUELS INITIATIVE

The cleaner vehicles and fuels initiative was endorsed by CCME in October 1995. This initiative has further tightened new vehicle emissions standards and will introduce new alternative low-emission vehicles (10 per cent lower NO<sub>X</sub> emissions and seven per cent lower VOC emissions) beginning in 2001.

### LOWER SULPHUR IN GASOLINE

In October 1998, Environment Canada introduced new regulations under the CEPA to significantly lower the allowable level of sulphur in gasoline sold in Canada. The proposed regulations would reduce the sulphur content in gasoline to an average level of 30 parts per million (ppm) with a maximum of 80 ppm. This level represents a 90 per cent reduction from current average levels.

To reduce the effect on industry, the requirement would be phased in, with the allowable level lowered to an average of 150 ppm (with a maximum of 200 ppm) by 2002. The 30 ppm level would come into effect in 2005. Regulations on low-sulphur diesel fuel came into effect for on-road vehicles on January 1, 1998.

Sulphur occurs in petroleum products, and causes increased emissions of sulphur dioxide and sulphate particles, both of which contribute to air pollution. Sulphur also decreases the efficiency of emission control systems in vehicles, resulting in higher emissions of other pollutants. A federal-provincial working group estimates that over a period of 20 years, low-sulphur gasoline would prevent 2,100 premature deaths, 93,000 incidences of bronchitis in children and five million other health-related incidents such as asthma attacks.



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